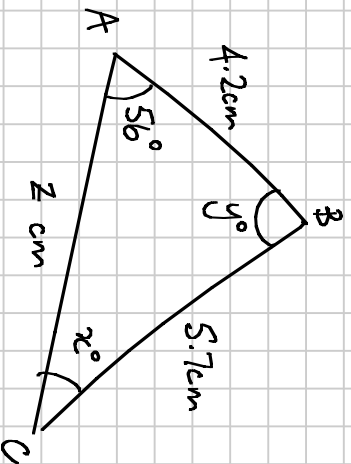


C2 Exercise 2F (combinations of Pythagoras & trigonometry)

Note Title

02/02/2012

1a



$$\frac{\sin x}{4.2} = \frac{\sin 56}{5.7}$$

$$\Rightarrow x = \sin^{-1}\left(\frac{4.2 \sin 56}{5.7}\right)$$

$$x = 37.65242107 \text{ (1)}$$

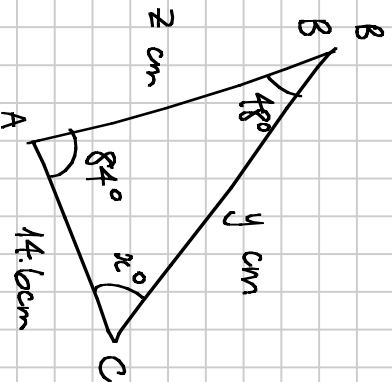
$$x \approx 37.7^\circ$$

$$y = 180 - (56 + x) = 86.34757893 \text{ (2)} \approx 86.3^\circ$$

$$\frac{z}{\sin y} = \frac{5.7}{\sin 56} \Rightarrow z = \frac{5.7 \sin(86.3)}{\sin 56} = 6.861477337$$

$$z \approx 6.86 \text{ cm (3 s.f.)}$$

1b



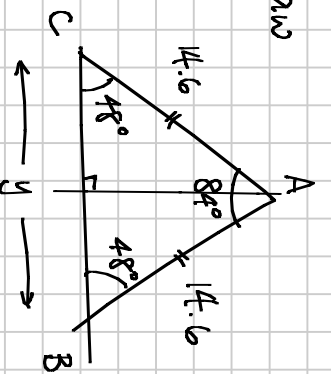
$$x = 180 - (48 + 84)$$

$$x = 48^\circ$$

\Rightarrow it's isosceles!

$$\Rightarrow z = 14.6 \text{ cm}$$

Redraw

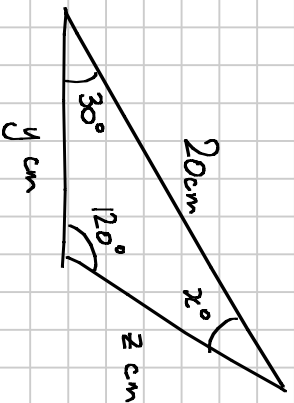


$$\Rightarrow \frac{1}{2}y = 14.6 \cos 48^\circ$$

$$\Rightarrow y = 19.53861371$$

$$y \approx 19.5 \text{ cm}$$

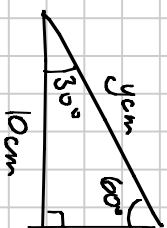
1c



$$x = 180 - (120 + 30) = 30^\circ$$

\Rightarrow it's isosceles $\Rightarrow y = z$

Redraw half of it:



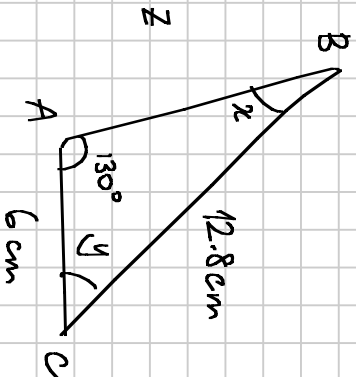
$$\cos 30 = \frac{10}{y}$$

$$\Rightarrow y = \frac{10}{\cos 30^\circ}$$

$$\text{now } \cos 30^\circ = \frac{\sqrt{3}}{2} \quad \text{so } y = \frac{20}{\sqrt{3}} = \frac{20\sqrt{3}}{3}$$

$$y = z = \frac{20\sqrt{3}}{3} = 11.54700538 \approx 11.5 \text{ cm.}$$

1d



$$\frac{\sin 130}{12.8} = \frac{\sin x}{6}$$

$$\Rightarrow x = \sin^{-1}\left(\frac{6 \sin 130}{12.8}\right)$$

$$x = 21.04391102 \quad (*)$$

$$x \approx 21.0^\circ$$

$$y = 180 - (130 + x)$$

$$y = 28.95608898 \approx 29.0^\circ \quad (3)$$

$$\frac{z}{\sin y} = \frac{12.8}{\sin 130}$$

$$\Rightarrow z = \frac{12.8 \sin(29.0)}{\sin 130}$$

$$z = 8.089584768 \approx 8.09 \text{ cm.}$$

